

LDWSF
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Subject Request for help on Duwamish food web model question

Earl, Todd and Larry:

We'd like to have a conference call with you to discuss whether and what water quality sampling is needed for the the food web model (FWM) at the Lower Duwamish Waterway SF site. We'd like to discuss with you whether the Duwamish PRPs' proposal for filling the WQ "box" of the FWM seems reasonable to you, whether they are doing an adequate amount of WQ sampling, and if not, we'd like to come back to them with specific guidance for a WQ sampling program. I've provided some background info below, and we'd like to schedule a conference call (just with us, not the PRPs) to discuss this.

(b) (6), so Bruce Duncan will be orgainzing the call. **Please let Bruce know your availability 10/25 - 11/18, and he'll orgainize the call.** In the meantime, please feel free to call or e-mail any of us if you have questions or need more information.

Thanks in advance for your help.

Here's some background information:

King County did a water quality sampling and modeling program in the 90's for their CSOs in Elliot Bay and the Duwamish River. They did weekly samples (w/some gaps due to equipment problems) from 10/30/96 - 6/30/97 for metals and conventionals. For Duwamish they had three stations, where they did a transect of 3 samples (2 at the Norfolk CSO, where the channel is narrower) at two depths, 1 m below the surface, and 1 m above the bottom. PCB/PAH/pesticide sampling was much more limited - they got no detects with conventional sampling, so they went to SPMDs. They deployed 2 SPMDs (same depths as metals samples) 50' off the Duwamish/Diagonal and Brandon St CSOs (both at the downstream portion of our site) for two weeks in early spring (wet season/high flow conditions). The SPMD data were used to calculate PCB congener-specific concentrations for 19 congeners. No total PCB or Aroclor measurements were made. They used these data (PCBs metals, conventionals) to calibrate their EFDC model, which they used to predict annual average contaminant concentrations at Duwamish and Elliot Bay. Our understanding is that the EFDC model uses hydrodynamic info, sediment contaminant concentrations, and a diffusion factor to predict water quality. (Earl has King County's model and has enhanced it with a tighter grid, for some work he was doing looking at how well EFDC simulated flow conditions in a salt-wedge estuary.)

The PRPs propose to update the EFDC model (using their original version, not Earl's enhanced version) to get the WQ input parameters for the Duwamish Food Web Model (at this point, the proposal is to model only PCBs). They are collecting a very limited amount of additional PCB water data, consisting of 2 stations, mid-navigation channel at the lower turning basin (pretty much the downstream end of our site, near an area that was recently remediated) and at the 16th Ave South Bridge (middle of our site - high PCB concentrations are found near the bank here, but mid-channel sediment concentrations are low). They will get 2 samples from each station (1 m below surface and 1 m above bottom) at 4 dates in August, Sept, November, and December (so they should have better coverage of high flow vs low flow conditions). Samples are being sent to Axys for full scan PCB congener analysis (Axys says they can measure ng/kg concentrations w/a 1 L sample(!)) plus temperature, salinity, density, turbidity and dissolved oxygen. These stations are routinely sampled for conventionals, including DOC and TOC. In addition, they will update the EFDC model with the additional sediment data from our recent sampling.

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Model output can give annual or monthly average WQ concentrations, over the whole site or over a designated portion of the site.

We are of course questioning the limited number of PCB samples. King County modelers say not to worry about the relatively small number of PCB samples since they can (and have) calibrated the model using the much larger data set for conventionals and metals. They are also saying this estuarine river (with a salt wedge that moves nearly the entire length of the site on a daily basis) is so well mixed that it doesn't matter that the only PCB samples they'll have to calibrate the model are mid-channel and mid- and downstream. The PRPs are emphasizing that the first run of the model only overpredicted aqueous PCB concentrations (as compared to the SPMD data) by a factor of 2 or 3. That amount of variation, in their minds, wasn't so bad since the ultimate use of the predicted data will be as input to the LDW food web model. They believe that the predicted tissue concentrations of even the ROC with the most water-column exposure (e.g., shiner perch) won't be sensitive to fairly large variations in water concentrations.

We are concerned that the past and current sampling program does not adequately capture the spatial and temporal heterogeneity seen at the site, but we don't want to ask them to collect more data unless it is really needed for the FWM. We'd like to talk with you about how one would determine the necessary spatial and temporal representativeness to input into the FWM. If you do recommend additional sampling, we'd like to discuss the pros and cons of SPMDs vs grabs vs other types of sampling techniques.

Thanks again - and we look forward to talking to you.

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